Examining the Effects of Exercise on Stressed Individuals' Alcohol Expectancies

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**Abstract**

The current study examined the effect of exercise habits on alcohol expectancies and drinking behaviors. Previous research has suggested that under times of stress, individuals, especially without alternative effective coping mechanisms, often turn to alcohol (Cooper, Russell, Skinner, Frone, & Mudar, 1992).  Exercise and alcohol produce many of the same psychological effects and both serve as stress reducers (Brown, Read, Marcus, Jakicic, Strong, Oakley, Ramsey, Kahler, Stuart, Dubreuil, & Gordon, 2010). The Discounting Principal reveals a tendency to discount all other causes when there is support that a given cause is already known to be responsible for a given event (Ahn & Bailenson, 1996).  Since exercise and alcohol are both used to alleviate stress and exercise is a more effective coping mechanism than alcohol use, exercising individuals may discount alcohol as a stress reducer. Therefore, the current study hypothesized that under times of stress, individuals who exercise will have less positive expectancies of alcohol than those who do not exercise and will therefore drink less. Results revealed that exercise was not a significant indicator of alcohol expectancies and drinking behavior.  However, alcohol expectancies were a significant indicator of drinking behavior.

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Alcohol abuse among college students is prevalent and is a major concern of many colleges. Alcohol abuse is such a widespread concern, there is national action confronting college binge drinking. Several institutions including The National Institute on Alcohol Abuse and Alcoholism the Centers for Disease Control and Prevention, the U.S. senate and the House of Representatives, and the World Health Organization, and Mothers Against Drunk Driving have made significant efforts to reduce college binge drinking (Wechsler & Nelson, 2001). Furthermore, the U.S. Surgeon General made one of the health goals to reduce college drinking by 50 percent by the year 2010 for the nation (Wechsler & Nelson, 2001).

Martens, Taylor, Damann, Page, Mowry, and Cimini (2004) discussed national studies that have found that about 40 % of college students studied engaged in heavy episodic drinking within the past 2 weeks and about one third of all college students met the criteria for alcohol abuse or dependence in the past 12 months, as determined by the Diagnostic and Statistical Manual of Mental Disorders. Wechsler and Dowdall (1998) found similar high results. They surveyed 130 colleges selected from the American Council of Education's list of accredited universities from 39 states. Using a self-administered questionnaire about alcohol and tobacco and other drug use, student lifestyle, and demographic and background characteristics, they found that students' heavy alcohol use is the most serious public health problem confronting American colleges. Wechsler and Dowdall (1998) cite results from the Harvard School of Public Health College Alcohol Study in 1993. They found that binge drinking was common among college students. Forty-four

percent of students were labeled binge drinkers, men reported that they had five or more drinks at one time, and the women reported having four or more drinks in a row at least once in the two weeks prior to the survey. At one third of the colleges, more than half of the students were identified as binge drinkers. The study also noted that binge drinking was especially common in fraternities and sororities.

Furthermore, the study found that binge drinkers were putting themselves and other students at risk. Bing drinking was associated with higher risks for educational, interpersonal, health, and safety problems for the drinker (Wechsler & Dowdall, 1998).  Students who do not binge drink, but live on high-binge campuses are twice as likely to be assaulted by a drinking student, three times more likely to have their property damaged, and three times more likely to be disrupted while sleeping or studying than on low-binge campuses (Wechsler & Nelson, 2001). Previous studies have also found that each year roughly 1,400 college students are killed, and 500,000 are injured from unintentional alcohol related injuries (Hingson, Heeren, Zakocs, Kopstein & Wechsler, 2002, as cited by Martens et al., 2004). Significantly more frequent binge drinkers engage in unplanned sexual activity, get hurt or injured, and experience a minimum of five alcohol-related problems than do nonbinge drinkers (Weschler & Nelson, 2001). Perkins and Berkowitz (1986) found additional negative consequences of drinking including fights or interpersonal arguments, negative effects on academic performance, damaged relationships or trouble with authorities.  In Engs' 1977 nationally representative study of 13 campuses, 51 percent of the participants encountered between one and four alcohol related problems the previous year. Only 20 percent of those who drank reported

no problems (Berkowitz & Perkins, 1986). These studies revealed negative consequences of drinking for all drinkers in addition to nondrinking individuals living on alcohol prevalent campuses.

Since binge drinking has been a major concern, it is important to understand drinking motivations. Research has suggested that alcohol expectancies are indicative of drinking behaviors. Archana Jajodia and Mitchell Earlywine (2003) researched implicit measures of alcohol expectancies, which provided a measure of the strength of associations of alcohol concepts to positive or negative beliefs in memory, and its accuracy in predicting alcohol use. The study was conducted to build on past research that has already established that the association of alcohol concepts to positive or negative outcomes in memory is important when examining alcohol expectancies and drinking behaviors; however, that has focused on explicit processes. The study consisted of 115 college students, male and female and of different ethnicities. However, there were more females than males. Implicit measures were administered first through the use of two IAT tasks given to participants on a computer screen. Participants were asked to categorize the series of stimuli words presented by giving a left or right response on the computer keyboard by pressing either of two keys. In the first block, participants categorized concept discrimination items, 12 alcoholic beverages and 12mammals, as either alcohol or mammal. In the next task, the second block, the attribute discrimination task, participants categorized items, which were 12 positive adjectives related to the effects of alcohol and 12 neutral adjectives, as positive or neutral. Then, in the third block, concept and attribute blocks were combined and participants categorized alcohol + positive expectancy words with one key and mammal and neutral words with another.

Stimuli consisted of 12 alcoholic beverages, 23 names of mammals, 12 positive adjectives, and 23 neutral adjectives used previously. A fourth block was identical to the third block and was used to calculate the IAT effect. In the fifth block, the reversed attribute discrimination task, participants repeated Block 2, however, with reversed key assignment. Then participants practiced the reversed combined task in the sixth block. In this block, stimuli used were identical to stimuli presented in the third block, however, with key assignments on the attributes reversed. Finally, Block 7 was identical to Block 6 and was used to compute the IAT effect. The IAT was calculated as the difference between the trimmed mean of latencies for Block 7 and the trimmed mean of latencies for Block 4. This calculation assesses the difficulty participants had in responding to alcohol and positive expectancy words with different keys, compared to responding to them with the same key. The more these positive expectancy words were related to alcohol concepts in memory, the more perceived difficulty the person would have on the incompatible responding task and the greater the positive IAT score would be. Reaction time accounted for outliers, which were eliminated so that the data would not be skewed. When participants associated words like happy with alcohol it suggested that they implicitly thought that alcohol makes them happy/ attractive; when they were then asked to associate alcohol with neutral stimuli participants would be slower because they don't associate alcohol with those words. The negative reaction time was calculated by the difference between negative and the alcohol and the neutral and alcohol reaction time. The same procedure was used for calculating the positive reaction time. Next participants completed their daily drinking data for the past 30 days based on the time line follow-back method (TLFB; Sobell & Sobell, 1995). Then participants completed the Rutgers

Alcohol Problem Index, the RAPI (White & Labouvie, 1989), which examines the

problems in drinking in adolescents and measures consequences. Participants also

completed the Alcohol Expectancy Questionnaire, the AEEQ (Brown et al., 1987). In

addition, participants answered general information questions and about their families'

drinking histories as well as their drinking habits in the past. The authors concluded that

positive memory associations to alcohol, as measured by the IAT, are legitimate

predictors of drinking behavior.

Since research has suggested that positive alcohol expectancies predict

drinking behavior, it is crucial to understand why people think positively about

alcohol. Previous research has suggested that there is a relationship between stress

and alcohol expectancies and consumption. As cited by Perkins (1999), Hittern

(1995) found that students who hold greater tension-reduction expectancies about

the effects of alcohol drink more frequently than their peers. Furthermore, those

who experienced more stressful events displayed a greater yearning to drink

(Hittern 1995, as cited by Perkins, 1999).

Individuals not only maintain a stronger desire to drink under times of

stress, they also have more positive alcohol expectancies than stress free individuals

(Conger, 1956). Conger (1956) proposed that alcohol reduces fear associated with

conflict, reinforcing alcohol use under times of stress. Read, Wood, Kahler, Maddock,

and Palfai (2003) examined the role of drinking motives in college students. Their

article noted a theoretical model of drinking motives done by Cox and Klinger

(1988), which suggested that mood relevant expectancies contributed to both the

motivation to drink alcohol and alcohol consumed. Spada, Moneta, and Wells (2007)

studied alcohol expectancies and subsequent drinking behaviors. In their study,

they sampled 355 students and professionals from London universities. Using the

Alcohol Outcome Expectancies Scale (Leigh & Stacy, 1993), alcohol expectancies

were measured. AOES examined positive and negative alcohol effects. Participants

rated how likely the consequences listed are to take place if they drank alcohol. The

positive Alcohol Metacongitnion Scale (PAMS; Spada & Wells, 2006b) was used to

evaluate positive metacongnitive beliefs about alcohol use. The Negative Alcohol

Metacongnition Scale (NAMS; Spada & Wells, 2006b) was used to evaluate negative

metaconginive beliefs about alcohol.  The Quantity Frequency Scale (Cahalan et al.,

1969) measured alcohol consumption levels over a period of thirty days. The

Alcohol Use Disorders Identification Test (Babor et al., 1992**)** was used to detect

problem drinkers. The study found that positive and negative metacongnitive beliefs

about alcohol use were indicative of drinking behavior, suggesting that "believing

that alcohol use is an effective strategy for controlling thoughts, reducing self-

consciousness, solving problems, and managing emotion may be fundamental to the

initiation of dinking behavior" (Spada et al., 2007, 573).

　　　Read, Wood, Kahler, Maddock, and Palfai (2003) built on previous research.

Their findings, consistent with previous findings, revealed that alcohol consumption

is often a form of negative reinforcement: it provides some relief of negative

emotions, making such emotions more tolerable. Furthermore, Read et al. (2003)

suggested the importance of distinguishing between positive and negative types of

motives for alcohol use in college drinkers. Cooper, Russell, Skinner, Frone, and

Mudar (1992) cites Abrams and Niaura (1987), whose research has suggested that

an individual must first believe that alcohol will relieve negative emotions before using alcohol to alleviate negative affect. In their study, Cooper et al. (1992) collected personal data, using 27 professionally trained interviewers. The respondents were drawn from a random sample of 1,933 household residents in Erie County, New York. Measures used included stressors, which were a count of negative life events experiences during the past year as well as problems experienced with the past month. Availability of alternative, adaptive coping responses was also assessed using ten standard psychological measures. Such measures evaluated coping styles, personal resources, and interpersonal resources. Lastly, alcohol expectancies were measured. An alcohol effect questionnaire assessed expectancies for global positive effects, social and physical pleasure, tension reduction, etc. In addition, alcohol outcome measures were collected. Four self-reports required respondents to answer information on alcohol use as a coping mechanism, average alcohol intake within the past 12 months and 30 days, and drinking problems experienced within the past 12 months. Results supported a stressor vulnerability model, suggesting that stressors were highly predictive of alcohol use and abuse among men who relied on avoidant forms of emotional coping or held positive alcohol expectances. The researchers also found that both men and women who held strong positive expectancies seemed to dink more heavily and experience more alcohol problems, however, men holding such beliefs may be at a greater risk. Furthermore, the findings suggest that maladaptive emotion-focused coping may be critical (Cooper et al., 1992).

Volpicelli, Balarman, Hahn, Wallace, and Bux (1999) found that following a traumatic situation, people reported alcohol use as way to ease anxiety, irritability, and depression. Volpicelli et al. (1999) presented a model suggesting uncontrollable trauma in individuals should lead to a release of endorphins and increased numbing. Research has shown that when presented with inescapable shock, pain response decreases in response to increased release of endogenous opiods.  Therefore, endorphin activity increases in response to trauma. Similarly, alcohol use can increase endorphin activity and can compensate for the endorphin withdrawal that follows a traumatic experience (Volpicelli et al., 1999).

Previous research has shown that exercise can provide some of the same rewarding psychological effects as alcohol and has been used to treat disorders. Brown, Read, Marcus, Jakicic, Strong, Oakley, Ramsey, Kahler, Stuart, Dubreuil, and Gordon (2010) discussed the physiological health benefits of exercise in general populations as well as in alcoholic samples.  In their Meta analysis, Brown et al. (2010) reason that exercise may be a useful recovery plan for alcoholics. Previous findings have shown that exercise has positive reinforcing properties, which may be a consequence of the effects that exercise has on the enogenous opiod system and on dopaminergic reinforcement mechanism. Additionally, Murphy, Pagano and Marlatt (1986), as cited by Brown et al. (2010), found that heavy drinkers experienced a "high" connected with exercise. Exercise has also been shown to have a positive influence on depressive symptoms and mood (Byrne & Byrne, 1993, as cited by Brown et al., 2010). Additionally, aerobic exercise provided more positive outcomes for depression compared to no treatment control conditions and to more

traditional treatments, such as cognitive treatments and antidepressant medication.

Therefore, exercise seems to reduce depressive and anxiety symptoms. Previous

literature, as cited by Brown et al. (2010), has also found that people may drink

because they lack coping skills crucial for confronting life stressors. Crews and

Landers (1987), as cited by Brown et al. (2010), found a significant relationship

between aerobic fitness and reactivity to stressors: aerobically fit individuals

displayed a reduced psychosocial stress response when compared to controls.

McAuley, Courneya, and Lettunich (1991), as cited in Brown et al. (2010), found that

exercise enhanced self-efficacy in men and women. Under times of stress, a coping

mechanism that enhances self-efficacy may lead one to have less positive

expectancies of alcohol. Additionally, exercise has been shown to provide short-

term relief from alcohol cravings (Ussher, Sampuran, Doshi, West, & Drummond,

2004, as cited by Brown et al., 2011).  Furthermore, a study done by Muprhy,

Pagano, and Marlatt in 1986, as cited by Brown et al. (2011), assigned heavy

drinking college students to running, yoga/mediation, or no treatment control for

eight weeks. The individuals in the exercise condition significantly decreased their

alcohol consumption compared to the controls. Since stressed individuals may crave

alcohol, especially since alcohol provides endorphins, those who exercise may

experience reduced cravings.  Thus, exercise may help stressed individuals have less

positive expectancies of alcohol and, therefore, help them drink less.

　　　As previously mentioned, alcohol use serves as a general coping mechanism

relied upon when other more effective coping strategies are unavailable. The

Discounting Principle reveals "a tendency to discount all other causes when there is

support that a given cause is already known to be responsible for a given event"

(Ahn & Bailenson, 1996, 83). Alcohol and exercise are both used to alleviate stress.

Since exercise is a more effective coping mechanism and provides similar

psychological benefits as alcohol does for stressed individuals, individuals who

routinely exercise should hold less positive expectancies of alcohol than those who

do not regularly exercise. As a result, these individuals will presumably drink less.

Cooper, Russell, Skinner, Frone, and Mudar (1992) discussed a similar phenomenon

in "Stress and Alcohol Use: Moderating Effects of Gender, Coping, and Alcohol

Expectancies." Cooper et al. (1992) cite the studies of Tucker, Vuchinich, and Sobell

(1981). In the first study done by Tucker et al. (1981), participants were led to feel

uncertain about their ability on an upcoming intellectual performance task and

drank more than subjects who expected success. In the case that a practical

performance-enhancing option was offered, such as studying task-relevant

resources, those participants who were unsure of their ability no longer drank more

than confident participants. This study suggests that when an alternative coping

mechanism is present and feasible, individuals are likely to have less positive

alcohol expectancies and thus rely less on alcohol.

The current study examined general information, stress level, exercise habits,

alcohol expectancies, and drinking behavior using a short General Questionnaire

(Appendix A) the Perceived Stress Scale (PSS; Appendix B), the Goldin Leisure-Time

Exercise Questionnaire (Appendix C), the Implicit Association Test (IAT), the Alcohol

Expectancy Questionnaire (AEQ; Appendix D), and the Time-Line Follow Back (TLFB;

Appendix E). The current study hypothesized that under times of stress, as indicated by

high PSS scores, individuals who exercise, as indicated by high Goldin Leisure Exercise scores, will have less positive expectancies of alcohol (lower IAT and AEQ scores) than those who do not exercise. Furthermore, since exercising individuals will presumably hold less positive beliefs about alcohol, they will consume less alcohol (as indicated by the TLFB).

## Method

### Participants

Seventy-three females and 28 males enrolled at Union College volunteered on an informed consent basis to perform as research participants for class credit or $4. Twenty-five participants were freshman, 20 were sophomores, 20 were juniors and 36 were seniors. Participants were recruited from introduction to psychology courses as well as the Freud website. Participants performed the same tasks in the same order: they completed the General Questionnaire, the Godin–Leisure Time Exercise Questionnaire (Godin & Shephard, 1985), the Perceived Stress Scale (PPS; Cohen, Kamarck, & Mermelstein, 1983), the Alcohol Timeline Followback (TLFB; Sobell & Sobell, 1992), the Comprehensive Alcohol Expectancy Questionnaire (Demmel & Hagen, 2003 a, 2003 b, as cited by Nicolai, Demmel, & Moshagen, 2010), and the Valence Alcohol Implicit Association Test (Wiers et al., 2002).

### Materials

The current experiment asked about general information (Appendix A) and measured stress level (Appendix B), exercise habits (Appendix C), alcohol behaviors (Appendix D), and implicit and explicit alcohol beliefs (Appendix E) using a series of questionnaires and a computer task. General information was used to rule out

potential confounds and to assess potential relationships between alcohol beliefs and behaviors and grade year, gender, Greek life, and athletic teams. The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) measured stress levels, the Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985) examined exercise habits, the Timeline Followback  (Sobell & Sobell, 1992) recorded long term drinking habits, the Comprehensive Alcohol Expectancy Questionnaire (Demmel & Hagen, 2003a, 2003b, as cited by Nicolai, Demmel, & Moshagem, 2010) measured explicit alcohol expectancies, and the Valence Alcohol Implicit Association Test (Wiers et al., 2002) measured implicit alcohol expectancies.

**Procedure**

First, participants completed a general questionnaire asking to circle their appropriate gender and class year and whether or not they are a member of a sports team or Greek life at Union College.

Participants' current stress level was measured using the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), the most widely used psychological tool for measuring perceived stress. Questions asked directly about current levels of stress. They also revealed how unpredictable, uncontrollable, and overloaded respondents found their lives.  The questions asked about feelings and thoughts during the last month. Respondents were asked how often they felt a certain way on a scale from 0  (never) to 4 (very often). PPS scores were obtained by reversing responses to the four positively stated items (4, 5, 7,8) and then summing all across all scale items.

Next, participants were administered the Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985) to assess frequency of exercise. The questionnaire measured the amount of time on average participants engaged in strenuous exercise, moderate exercise, mild exercise, and regular activity long enough to work up a sweat during their free time (for more than 15minutes) within a week.  Examples of strenuous, moderate, and mild exercise and examples of regular activity were provided. Total weekly leisure activity was calculated by summing the following products: (9 X Strenuous),  (5 X Moderate), and (3 X Light).

Participants were then asked about drinking habits using the Timeline Followback (Sobell & Sobell, 1992). Participants were asked to recall the amount of drinks that they consumed per day for the past 62 days on a calendar. Participants were given instructions, which indicated what to fill in, reminded them that it is a best estimate, and gave them helpful hints (such as, "If you have regular drinking patterns you can use these to help recall your drinking"). The Timeline Followback also included a sample calendar and U.S. standard drink conversion chart. The calendar included holidays to better help the participants accurately remember drinks consumed.

Next, participants' alcohol expectancies were examined. Their explicit alcohol expectancies were measured using the Comprehensive Alcohol Expectancy Questionnaire adopted from Demmel & Hagen (2003a, 2003b), as cited by Nicolai Demmel, & Moshagem (2010). The questionnaire included five factors: Social Assertiveness and Positive Affect (19 items), Tension Reduction (10 items), Cognitive Impairment and Physical Discomfort (13 items), Aggression (4 items) and

Sexual Enhancement (5 items). Respondents read the phrase "When I drink

alcohol...." and then were asked to indicate their level of agreement on a 5-point

Likert-scale ranging from 1 (not at all) to 5 (definitely) to the following statements.

Examples of statements from each factor include: "I am more relaxed and more at

ease socially,"  "I can switch my mind off better, I have difficulty concentrating,"  "I

am irritable and hotheaded," and "Sex is more intense."

Finally, participants' implicit alcohol expectancies were measured using the

Valence Alcohol Implicit Association Test (Wiers et al., 2002), an alcohol IAT

template measuring negative or positive implicit associates with alcohol. Previous

research has suggested that alcohol implicit association tasks are an effective way to

measure alcohol expectancies and drinking behaviors (Jajodia & Earlywine, 2003).

Participants performed this task on a computer in the lab after completing the series

of questionnaires. They were given the following directions: " Put your middle or

index fingers on the E and I keys of your keyboard. Words representing the

categories the top will appear one-by one in the middle of the screen. When the

items belongs to a category on the left, press the E key; when the item belongs to a

category on the right, press the I key. Items belong to only one category. If you make

an error an X will appear- fix the error by hitting the other keys." Participants were

told to go as fast and accurately as possible.  In the first section, participants were

asked to associate the word that appeared in middle of the screen with alcohol or

soda (ex. vodka, coke).  In the next round, they were asked to categorize the word

appearing on the center of the screen as negative or positive (ex. tedious, nice),

"positive" appeared on the upper left corner and "negative" on the right. Then the

four categories previously seen separately appear together: sodas or positive on the

left and alcohol or negative on the right (vodka, tedious, nice, coke). Next,

participants were given the same directions except soda and positive appeared on

the left and alcohol and negative appeared on the right. Then, participants went

through the same tasks, however, alcohol appear on left and soda on the right, then

alcohol or positive on the left and soda or negative on the right, and finally alcohol

or positive on the left and soda or negative on the right, After completing the task,

they were given a score indicating their implicit alcohol beliefs.

**Results**

      To assess the main predictions, controlling for gender, Greek affiliation, year

in school, and whether a participant was an athlete, IAT scores were regressed on G-

L exercise scores, perceived stress scores, and their interaction. Although the overall

regression equation was not significant, $F (7, 100) = 1.156$, $p > .05$, the analysis did

reveal a significant exercise x stress interaction, $ß = .59$, $t (100) = 3.155$, $p = .034$

(neither main effect was statically significant). This interaction is depicted in Figure

1 and suggests that high stressed, low exercising and high exercising, low stressed

individuals held the most negative alcohol expectancies, whereas low exercise, low

stress and high exercise, high stressed individuals held the most positive alcohol

expectancies.

      In order to examine if alcohol expectancies were appropriate indicators of

alcohol intake, a correlation test was preformed. A Pearson's *r* was performed to test

the relationship between IAT scores and alcohol consumption scores, and revealed a

significant correlation, *r* $(N=101) = .244$, *p < .05*. This correlation suggests that the

higher the IAT score, the more positively individuals thought of alcohol, the more they

drank.

Differences between genders and class year and alcohol behaviors were

examined. A Person's *r* was performed to test the relationship between gender and

alcohol consumption scores, and revealed a significant correlation, *r* (N=101) = -.414, *p* <

.05. A Pearson's *r* was performed to test the relationship between class year and alcohol

consumption scores, and revealed a significant correlation, *r* (N=101) = .285, *p* < .05.

These correlations revealed that males consumed significantly more alcohol than females.

Within the past sixty-two days, males averaged 178.5357 drinks, whereas females

averaged 62.336 drinks. Alcohol consumption varied significantly by class year; the

higher the class year, the more students drank. Within the past sixty-two days, freshman

consumed on average 55.880 drinks, sophomores consumed 66.725 drinks, juniors

consumed 78.9000 drinks, and seniors consumed 145.556 drinks.

In order to examine if there was a relationship between exercise habits and

alcohol expectancies, a series of Pearson Correlation tests were performed. A

Pearson's *r* was performed to test the relationship between exercise scores and IAT

scores, and did not reveal a significant correlation, *r* (N=101) = .017, *p* >.05. A Pearson's

*r* was performed to test the relationship between each subscale of the explicit alcohol

questionnaire, Social Assertiveness and Positive Affect, Tension Reduction, Cognitive

Impairment and Physical Discomfort, Aggression, and Sexual Enhancement, and total

alcohol consumed, and revealed no significant correlations, *r* (N=101) = .096, *p* >.05; *r*

(N=101) = -.016, *p* >.05; *r* (N=101) = -.002, *p* >.05; *r* (N=101) =. 027, *p* >.05; *r* (N=101)

= -.007, $p$ >.05. These correlations revealed that exercise habits were not accurate

indictors of alcohol expectancies.

## Discussion

The regression test revealed a significant interaction between stress level,

exercise habits, and IAT scores. However, the results were not what the current

hypothesis predicted. Although it was not surprising that high exercising, low

stressed respondents held more negative alcohol expectancies, as measured by the

IAT, it was unexpected that low exercising, high stressed individuals also held more

negative alcohol expectancies. Individuals who held the most positive alcohol beliefs

were low exercising, low stressed and high exercising, high stressed.  There are

several explanations for these results.  The mean IAT score (-.2412) was very low

and revealed that the average participant held negative alcohol beliefs. It is possible

that people were scoring below average due to reasons such as distraction,

inattentiveness, confusion over some of the terms (i.e. cassis, sinas, spa), and

associating the terms.  For instance, if a respondent associated tonic with the

alcoholic drink vodka soda, his/her response may be affected.

The current study supports previous findings, such as Jajodia and

Earlywine's (2003), which found that an implicit association task  (IAT) was a

significant indicator of drinking behaviors. The current study sought to add to

previous research examining the possible psychological effects of exercise. Since

previous findings have suggested that exercise serves as a tension reducer and

many people drink for the purpose of alleviating stress (Brown, Read, Marcus,

Jakicic, Strong, Oakley, Ramsey, Kahler, Stuart, Dubreuil, & Gordon, 2010; Joseph

Volpicelli, Geetha Balarman, Julie Hahn, Heather Wallace, & Donald Bux, 1999), in

the present research it was expected that stressed individuals who exercise would

have less positive expectancies of alcohol than non-exercising, stressed individuals.

Since it has been repeatedly suggested in previous research and supported in the

current study that alcohol expectancies are accurate indicators of drinking

behaviors, the current study also expected exercising, stressed individuals to drink

less than stressed, non-exercising individuals. The results do not support the

current hypothesis that exercising, stressed individuals will have less positive

alcohol expectancies and thus drink less than non-exercising, stressed individuals.

The current study included a general questionnaire, asking the respondent

about his/her gender, class year, if he/she is a member of Greek life, and if he/she is

a member of a sports team. This information is important because it rules out

potential confounds and allows for more control.

Certain aspects of the current study could detract from the validity of the

results. Previous research has suggested that drinking habits may vary by gender.

Although the current study did not find any significant differences between gender

and alcohol expectancies and behaviors, males and females were represented

disproportionally.  In the current study, there were seventy-three females and only

twenty-eight males. In "Gender differences in alcohol consumption and adverse

drinking consequences: cross-cultural patters," Wilsnack, Vogeltanz, Wilsnack, and

Harris (2000) found that men were more likely to drink than women were.

Furthermore, Wilsnack et al. (2000) found that male drinkers drink alcohol more

frequently, in larger quantities, and with higher risks of adverse consequences than female drinkers. In addition, they noted that men and women reacted differently to the intake of alcohol; therefore, men and women should differ in how they use alcohol and in how they behave when they consume alcohol. Previous research has suggested that females handle stress in more effective ways. In "Gender Differences in Coping with Stress: When Stressors and Appraisals Do Not Differ," Ptacek (1994) found that although men and women were similar in their cognitive assessment of stressful situations, they differed in preparatory coping mechanisms. Ptacek (1994) found that women relied on social support and on using emotion-focused coping more than men, whereas men used more problem-focused coping than women. Therefore, it is possible that females may be less likely to have positive expectancies of alcohol in the first place and are less affected by the stress reducing consequence of exercise in relation to drinking habits.

Furthermore, previous research has found that males and females exercise for different reasons. It could be that motives behind exercising can affect the psychological results of exercise.  Kilpatrick, Hebert, and Bartholomew (2005) found gender differences for physical activity motivation. Women's ratings of the importance of weight management for exercise were higher than were men's. Kilpatrick et al. (2005) also found that motives behind engaging in exercise and in sports differed: sports participation was more closely related to intrinsic motives, whereas exercise was associated with primary extrinsic ones. Enjoyment was more highly related to sport participation and body-related motivations, such as appearance, weight management, and strength and endurance were more highly

correlated with exercise participation. If people drink for motives such as weight loss, these motives may interfere with the stress reducing effects of exercise. It is also possible that exercise is creating stress for some individuals. It would be useful if future studies inquired about exercise motivations. The current study only had twenty participants who were members of sports teams. Future studies should recruit more participants on sports teams and compare their alcohol expectancies with those who are not members of an athletic team.

If the IAT did in fact accurately represent alcohol expectancies, the most surprising result was that high exercising and high stressed individuals had the most positive alcohol expectancies. However, it is important to keep in mind that the majority of participants scored negatively (having less positive alcohol expectancies). Therefore, respondents that indicated having more positive alcohol beliefs compared to the other respondents did not necessarily have high positive expectancies of alcohol. Results indicating that individuals who exercised often, were stressed, and had high positive alcohol expectancies may be explained by personality type or motives. For instance, if a person exercises vigorously multiple times a week, is very stressed, and drinks a lot, he/she may be an extremist. It is also possible that the person is trying desperately to overcome an issue, however, is in need of more help than exercise (i.e. therapy). It may also be the case that exercise is adding to these respondents' stress levels. For example, if these respondents are exercising for the wrong reasons, such as unneeded weight loss, or if they are not enjoying their workout for some reason, exercise may be a source of additional

stress. It would have been beneficial to ask about the respondents' motivations and attitudes towards exercise.

The current study found that the relationship between exercise habits and tension reduction expectancies of alcohol was close to being significant. It is possible that if there were more participants, there would have been a significant relationship. Furthermore, since drinking habits differed by grade, it would have been useful to have more participants in each grade. Since the current study sought to have a proportionate representation from each grade, there were only 25 freshman, 20 sophomores, 20 juniors, and 36 seniors.

There were limited participants in the current study who reported very high stress levels; the average stress score was 15.3069 (out of 40 possible points). Therefore, it is possible that stress levels need to be higher in order to support the current hypothesis. Stewart (1996) found that individuals with Post Traumatic Stress Disorder are at a greater risk of developing alcohol related problems. Furthermore, he proposed that these individuals might be using alcohol to self-medicate their PTSD symptoms. There may be a certain stress threshold that has to be met in order to hold positive alcohol beliefs and to use alcohol as a form of medication; the participants may not have met this threshold. Since the current study is not an experiment, there may also be a directionality issue. The majority of respondents reported that they exercise a decent amount. It is possible that participants were not stressed to begin with because they exercise and since they were not stressed, they did not need to drink for stress reducing reasons.

There is also the possibility that participants, Union College students participating for class credit or $4.00, may have rushed through the study and may not have answered accurately and honestly. It would be helpful if future studies included a larger and more diverse population. In addition to including more men and members of athletic teams, studies should look at individuals from different colleges as well as older individuals.
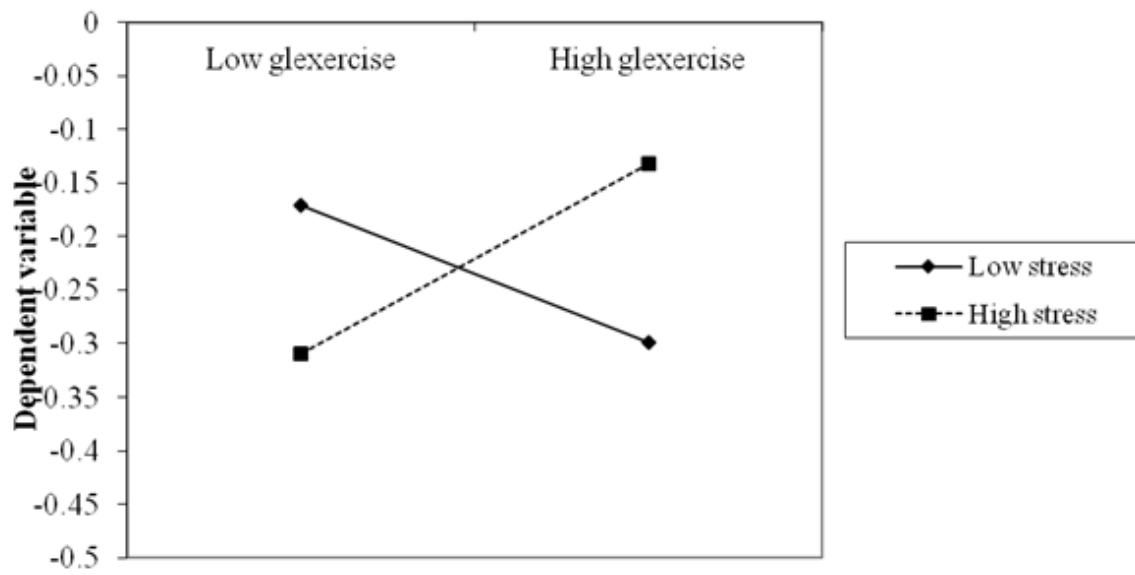
Graph 1: A regression test revealed a significant interaction between exercise

scores, stress scores, and IAT scores (the dependent variable).

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Appendix A

General Questionnaire:

Please Circle what applies to you.

Gender: M    F

Member of sports team: Yes   No

Member of Greek life: Yes    No

Class Year: Freshman   Sophomore    Junior     Senior

Appendix B

# Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

**0 = Never  1 = Almost Never      2 = Sometimes  3 = Fairly Often**
**4 = Very Often**

1. In the last month, how often have you been upset because of something that happened to unexpectedly?....................................        0    1     2    3   4


2. In the last month, how often have you felt that you were unable to control the important things in your life?........................................................ 0    1      2    3   4


3. In the last month, how often have you felt nervous and "stressed"? .............. 0     1   2    3   4


4. In the last month, how often have you felt confident about your ability to handle your personal problems?................................................................. 0    1     2    3   4


5. In the last month, how often have you felt that things were going your way?................................................................................. 0     1      2     3   4


6. In the last month, how often have you found that you could not cope with all the things that you had to do? ............................................................. 0    1      2    3   4


7. In the last month, how often have you been able to control irritations in your life?.................................................................. 0    1      2     3   4


8. In the last month, how often have you felt that you were on top of things?..... 0    1   2    3   4


9. In the last month, how often have you been angered because of things that were outside of your control? ...................................... 0    1      2    3   4


10. In the last month how often have you felt difficulties were piling up so high that you could not overcome

them?............................ 0    1      2    3   4

Appendix C

## Godin Leisure-Time Exercise Questionnaire

Considering a **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your **free time** (write on each line the appropriate number).

**Times Per**

**Week**

a) **STRENUOUS EXERCISE**

   **(HEART BEATS RAPIDLY)**

   (i.e. running, jogging, hockey, football, soccer,                    _____

   squash, basketball, cross country skiing, judo,

   roller skating, vigorous swimming,

   vigorous long distance bicycling)

b) **MODERATE EXERCISE**

   **(NOT EXHAUSTING)**

   (i.e. fast walking, baseball, tennis, easy bicycling,                    _____

   volleyball, badminton, easy swimming, alpine skiing,

   popular and folk dancing)

c) **MILD EXERCISE**

   **(MINIMAL EFFORT)**                                                  _____

   (i.e. yoga, archery, fishing from river band, bowling,

   horseshoes, golf, snow-mobiling, easy walking)

2. Considering a 7-Day period (a week), during your leisure-time, how often do you engage in

   any regular activity long enough to work up a sweat (heart beats rapidly)?

   OFTEN                    SOMETIMES                    NEVER/RARELY

   1. ☐                    2. ☐                    3. ☐

Note: Single questions have been validated from this questionnaire and used independently in published studies (4,8,9,10).

## INSTRUCTIONS

The individual is asked to complete a self-explanatory, brief four-item query of usual leisure-time exercise habits.

## CALCULATIONS

For the first question, weekly frequencies of strenuous, moderate, and light activities are multiplied by nine, five, and three METs, respectively (5). Total weekly leisure activity is calculated in arbitrary units by summing the products of the separate components, as shown in the following formula:

$$\text{Weekly leisure activity} = (9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$$

The second question is used to calculate the frequency of responses to the question regarding the frequency of weekly leisure-time activity "long enough to work up a sweat" (see questionnaire).

## EXAMPLE

$$\text{Strenuous} = 3 \text{ times/wk}$$

$$\text{Moderate} = 6 \text{ times/wk}$$

$$\text{Light} = 14 \text{ times/wk}$$

$$\text{Total leisure activity score} = (9 \times 3) + (5 \times 6) + (3 \times 14) = 27 + 30 + 42 = 99$$

## OTHER STUDIES USING THE QUESTIONNAIRE

In addition to the references cited above, other studies have used the Godin Leisure-Time Exercise Questionnaire (1,2,3,6,7,13).

Appendix D

| Instructions for Filling Out the Timeline Alcohol Use Calendar |
|---|

To help us evaluate your drinking, we need to get an idea of what your alcohol use was like in the past _____ days. To do this, we would like you to fill out the attached calendar.

✓ Filling out the calendar is not hard!

✓ Try to be as accurate as possible.

✓ We recognize you won't have perfect recall. That's OKAY.

### ✓ WHAT TO FILL IN

• The idea is to put a number in for **each day** on the calendar.

• On days when you did not drink, you should write a "0".

• On days when you did drink, you should write in the total number of drinks you had.

• We want you to record your drinking on the calendar using Standard Drinks. *For example,* if you

had 6 beers, write the number 6 for that day. If you drank two or more different kinds of alcoholic

beverages in a day such as 2 beers and 3 glasses of wine, you would write the number 5 for that

day.

**It's important that something is written for <u>every</u> day, even if it is a "0".**

### ✓ YOUR BEST ESTIMATE

• We realize it isn't easy to recall things with 100% accuracy.

• If you are not sure whether you drank 7 or 11 drinks or whether you drank on a Thursday or a Friday,

**give it your best guess!** What is important is that 7 or 11 drinks is very different from 1 or 2 drinks

or 25 drinks. The goal is to get a sense of how frequently you drank, how much you drank, and your

patterns of drinking.

### ✓ HELPFUL HINTS

• If you have an appointment book you can use it to help you recall your drinking.

• Holidays such as Thanksgiving and Christmas are marked on the calendar to help you better

recall your drinking. Also, think about how much you drank on personal holidays & events such

as birthdays, vacations, or parties.

- If you have regular drinking patterns you can use these to help you recall your drinking. For example, you may have a daily or weekend/weekday pattern, or drink more in the summer or on trips, or you may drink on Wednesdays after playing sports.


✓  **COMPLETING THE CALENDAR**

- A blank calendar is attached.  Write in the number of Standard Drinks that you had each day.
- The time period we are talking about on the calendar is

    **from** _____ **to** _____.

- In estimating your drinking, be as accurate as possible.

- **DOUBLE CHECK THAT <u>ALL</u> DAYS ARE FILLED IN BEFORE RETURNING THE CALENDAR.**

- Before you start look at the **SAMPLE CALENDAR AND STANDARD DRINK CHART** on the next page.

| Instructions for Filling Out the Timeline Alcohol Use Calendar |
|---|

✓ **SAMPLE CALENDAR**

| 2000 | SUN | MON | TUES | WED | THURS | FRI | SAT |
|---|---|---|---|---|---|---|---|
| | | | | | | 1    8 | 2    0 |
| S | 3    7 | 4 Labor Day   0 | 5    3 | 6    8 | 7    1 | 8    0 | 9    11 |
| E | 10   2 | 11   2 | 12   0 | 13   3 | 14   5 | 15   14 | 16   4 |
| P | 17   2 | 18   0 | 19   0 | 20   0 | 21   0 | 22   2 | 23   13 |
| T | 24   0 | 25   0 | 26   6 | 27   0 | 28   0 | 29   0 | 30   2 |

## U. S. STANDARD DRINK CONVERSION CHART
### One Standard Drink Is Equal To

◆ **12 oz of BEER (5%)**

◆ **5 oz of WINE  (10% – 12%)**

◆ **3 oz of FORTIFIED WINE (16% – 18%)**

◆ **1.5 oz of HARD LIQUOR (86 proof – 100 proof; 43% – 50%)**

◆ WINE: 1 Bottle

| | | |
|---|---|---|
| 25 oz/750 ml | = | 5 standard drinks |
| 40 oz/1.5 liter | = | 8 standard drinks |
| 25 oz fortified | = | 8 1/3 standard drinks |

◆ HARD LIQUOR: 1 Bottle

| | | |
|---|---|---|
| 12 oz (mickey) | = | 8 standard drinks |
| 26 oz | = | 17 1/3 standard drinks |
| 40 oz | = | 26 2/3 standard drinks |

Date: _____

# TIMELINE FOLLOWBACK CALENDAR: 2011-2012

## 1 Standard Drink is Equal to

| | | | |
|---|---|---|---|
| **One 12 oz can/bottle of beer** | **One 5 oz glass of regular (12%) wine** | **1 ½ oz of hard liquor (e.g. rum, vodka, whiskey)** | **1 mixed or straight drink with 1 ½ oz hard liquor** |

Recall your drinking habits for the past 2 months

**Complete the Following**

**Start Date** (Day 1): _____ **End Date** (yesterday):_____

MO      DY      YR                                              MO      DY      YR

| | | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| **N** | 6 | 7 | 8 | 9 | 10 | 11 Veterans' Day | 12 |
| **O** | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| **V** | 20 | 21 | 22 | 23 | 24 Thanksgiving | 25 | 26 |
| | 27 | 28 | 29 | 30 | 1 | 2 | 3 |
| **D** | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **E** | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **C** | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | 25 Christmas | 26 Hanukkah | 27 | 28 | 29 | 30 | 31 |

| **2012** | **SUN** | **MON** | **TUES** | **WED** | **THURS** | **FRI** | **SAT** |
|---|---|---|---|---|---|---|---|
| | 1 New Year's | 2 | 3 | 4 | 5 | 6 | 7 |
| **J** | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| **A** | 15 | 16 M. L. King | 17 | 18 | 19 | 20 | 21 |
| **N** | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | 29 | 30 | 31 | 1 | 2 | 3 | 4 |
| **F** | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **E** | 12 | 13 | 14 Valentine's Day | 15 | 16 | 17 | 18 |
| **B** | 19 | 20 Presidents' Day | 21 | 22 | 23 | 24 | 25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 26 | 27 | 28 | 29 | 1 Ash Wednesday | 2 | 3 |
| **M** | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **A** | 11 | 12 | 13 | 14 | 15 | 16 | 17 St. Patrick's Day |
| **R** | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **A** | 1 | 2 | 3 | 4 | 5 | 6 Good Friday | 7 Passover |
| **P** | 8 Easter | 9 | 10 | 11 | 12 | 13 | 14 |
| **R** | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | 29 | 30 | 1 | 2 | 3 | 4 | 5 |
| **M** | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **A** | 13 Mother's Day | 14 | 15 | 16 | 17 | 18 | 19 |
| **Y** | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| | 27 | 28 Memorial Day | 29 | 30 | 31 | | |

| 2012 | SUN | MON | TUES | WED | THURS | FRI | SAT |
|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 2 |
| **J** | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **U** | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| **N** | 17 Father's Day | 18 | 19 | 20 | 21 | 22 | 23 |
| | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **J** | 1 | 2 | 3 | 4 Independence Day | 5 | 6 | 7 |
| **U** | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| **L** | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | 29 | 30 | 31 | 1 | 2 | 3 | 4 |
| **A** | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **U** | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **G** | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| | 26 | 27 | 28 | 29 | 30 | 31 | 1 |
| **S** | 2 | 3 Labor Day | 4 | 5 | 6 | 7 | 8 |
| **E** | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **P** | 16 | 17 Rosh Hashanah | 18 | 19 | 20 | 21 | 22 |
| | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| **O** | 30 | 1 | 2 | 3 | 4 | 5 | 6 |
| **C** | 7 | 8 Columbus Day | 9 | 10 | 11 | 12 | 13 |
| **T** | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | 28 | 29 | 30 | 31 Halloween | 1 | 2 | 3 |
| **N** | 4 | 5 | 6 Election Day | 7 | 8 | 9 | 10 |
| **O** | 11 Veterans' Day | 12 | 13 | 14 | 15 | 16 | 17 |
| **V** | 18 | 19 | 20 | 21 | 22 Thanksgiving | 23 | 24 |
| | 25 | 26 | 27 | 28 | 29 | 30 | 1 |
| **D** | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **E** | 9 Hanukkah | 10 | 11 | 12 | 13 | 14 | 15 |
| **C** | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| | 23 | 24 Christmas Eve | 25 Christmas | 26 | 27 | 28 | 29 |
| | 30 | 31 New Year's Eve | | | | | |